Attorney's Docket No.: 111027-172835 Patent
IPN: P19049

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application for:	Examiner: Mered, Habte
Qinghua Li, et al.	Art Group: 2474
Application No.: 10/814,853	Confirmation No.: 5604
Filed: March 30, 2004	
For: SIGNAL RECEPTION APPARATUS, SYSTEMS, AND METHODS	

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APPELLANT'S APPEAL BRIEF

TO THE HONORABLE COMMISSIONER FOR PATENTS:

This brief is in support of a Notice of Appeal to the Board of Patent Appeals and Interferences filed on November 22, 2010, appealing the decision of the Examiner in the Final Office Action mailed July 20, 2010 ("Final Office Action"), in which the claims of the above-captioned application were rejected. Appellant respectfully requests consideration of this appeal by the Board of Patent Appeals and Interferences ("BPAI") for allowance of the present patent application.

I. REAL PARTY IN INTEREST

The real party in interest in the above-identified application is Intel Corporation of Santa Clara, CA.

II. RELATED APPEALS AND INTEREFERENCES

The Appellant's undersigned attorney and the assignee identified above are not aware of other appeals or interferences that would directly affect or be directly affected by, or have a bearing on the BPAI's decision in the subject appeal.

III. STATUS OF CLAIMS

Claims 1-26 and 32 were cancelled.

Claims 27-31 and 33-47 were rejected under 35 U.S.C. § 103(a) and are presently appealed.

Claims 27-28, 31, 33-39 and 47 were rejected over Ogawa et al. (Japanese Patent Application No. 2001-319308) in view of Shattil (US 2004/0086027) and Priotti (US 2004/0120410).

Claims 29 and 30 were rejected over Ogawa, in view of Shattil, Priotti, and Perahia et al. (US 7,352,718).

Claims 40 and 42-46 were rejected over Perahia, in view of Shattil and Priotti.

Claim 41 was rejected over Perahia, in view of Shattil, Priotti and Shattil (US 2002/0150070, referred to herein as Shattil'070).

IV. STATUS OF AMENDMENTS

A response, amending claims 27 and 35, was filed on October 20, 2010. As per an Advisory Action mailed November 02, 2010, the amendments were not entered. Accordingly, the currently pending claims correspond to the claims as filed in a response filed on May 03, 2010.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 27

Independent claim 27 is directed towards a method comprising computing, by a wireless access point, a channel matrix that is representative of a channel response for each of a plurality of channels, said computing based at least in part on training signals received over two or more antennas from multiple stations; receiving from multiple stations, at the wireless access point, a plurality of uplinked spatial division multiple access (SDMA) data streams that are out of synchronism by a time period greater than an allowed guard band time period; converting the plurality of SDMA data streams from a first time domain to a frequency domain; separating, with a spatial demapper, the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain based at least in part on the channel matrix; converting the separated plurality of data streams from the frequency domain to a second time domain; and synchronizing the separated plurality of data streams in the second time domain.

Support for claim 27 may be found at least in the following identified portions of the specification as filed. A Q x P channel matrix may be formed by a processor 270, based on training signals received over two or more antennas from multiple stations (paragraph 0034, lines 4-6, also see paragraph 0015 and Fig. 2). A plurality of SDMA data streams may be received from multiple stations, where the SDMA data streams may be out of synchronism by a time period greater than an allowed guard band time period (paragraph 0010, lines 6-10; paragraph 0011, lines 3-5; and paragraph 0021). The SDMA data streams may be converted from a first time domain to a frequency domain (e.g., by FFT modules 238, see Fig. 2, paragraph 0026, lines 1-5; and paragraph 0027, lines 1-3). The SDMA data streams in the frequency domain may be separated, with a spatial demapper (e.g., demultiplexer 234, see Fig. 2 and paragraphs 0025), into a separated plurality of data streams in the frequency domain based at least in part on the channel matrix (paragraph 0035). The separated plurality of data streams from the frequency domain may then be converted to a second time domain (paragraph

0035). The separated plurality of data streams may be synchronized in the second time domain (block 351 of Fig. 3, paragraph 0039, lines 4-5).

Independent claim 35

Independent claim 35 is directed towards an article comprising a memory have instructions stored thereon, wherein the instructions, when executed, cause the processor to perform computing, by a wireless access point, a channel response for each of a plurality of channels based on training signals received over two or more antennas from multiple stations, the computed channel response includes at least a channel matrix; converting a plurality of spatial division multiple access (SDMA) data streams from a first time domain to a frequency domain after the plurality of SDMA data streams have been received as a plurality of uplinked SDMA data streams that are out of synchronism by a time period greater than an allowed guard band time period; separating the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain based on the channel matrix; converting the separated plurality of data streams from the frequency domain to a second time domain; and synchronizing the separated plurality of data streams in the second time domain.

Support for claim 35 may be found at least in the following identified portions of the specification as filed. A channel response in the form of a Q x P channel matrix may be formed by a processor 270, based on training signals received over two or more antennas from multiple stations (paragraph 0034, lines 4-6, also see paragraph 0015 and Fig. 2). A plurality of SDMA data streams, which may be out of synchronism by a time period greater than an allowed guard band time period (paragraph 0010, lines 6-10; paragraph 0011, lines 3-5; and paragraph 0021), may be converted from a first time domain to a frequency domain (e.g., by FFT modules 238, see Fig. 2, paragraph 0026, lines 1-5; and paragraph 0027, lines 1-3). The SDMA data streams in the frequency domain may be separated, with a spatial demapper (e.g., demultiplexer 234, see Fig. 2 and paragraphs 0025), into a separated plurality of data streams in the frequency domain based at least in part on the channel matrix (paragraph 0035). The separated

plurality of data streams from the frequency domain may then be converted to a second time domain (paragraph 0035). The separated plurality of data streams may be synchronized in the second time domain (block 351 of Fig. 3, paragraph 0039, lines 4-5).

Independent claim 40

Independent claim 40 is directed towards an apparatus, including a separation module to separate a plurality of spatial division multiple access (SDMA) data streams into a plurality of separated data streams, in a frequency domain, after the plurality of SDMA data streams have been converted from a first time domain to the frequency domain, wherein the separation module is configured to separate the plurality of SDMA data streams in the frequency domain based at least in part on a channel matrix, and wherein the plurality of SDMA data streams have been received as a plurality of uplinked SDMA data streams that are out of synchronism by a time period greater than an allowed guard band time period; and a synchronization module to synchronize the separated plurality of data streams in a second time domain after the separated plurality of data streams have been converted from the frequency domain to the second time domain.

Support for claim 40 may be found at least in the following identified portions of the specification as filed. Fig. 2 illustrates a separation module (demultiplexer 234) to separate a plurality of SDMA data streams into a plurality of separated data streams (paragraph 0025), in a frequency domain, after the plurality of SDMA data streams have been converted from a first time domain to the frequency domain (e.g., by FFT modules 238, see Fig. 2, paragraph 0026, lines 1-5; and paragraph 0027, lines 1-3). The plurality of SDMA data streams may be received as a plurality of uplinked SDMA data streams that are out of synchronism by a time period greater than an allowed guard band time period (paragraph 0010, lines 6-10; paragraph 0011, lines 3-5; and paragraph 0021). Fig. 2 also illustrates a synchronization module to synchronize the separated plurality of data streams in a second time domain (block 351 of Fig. 3,

paragraph 0039, lines 4-5) after the separated plurality of data streams have been converted from the frequency domain to the second time domain (paragraph 0035).

Independent claim 44

Independent claim 44 is directed towards a system that comprises a separation module to separate a plurality of spatial division multiple access (SDMA) data streams into a plurality of separated data streams, in a frequency domain, after the plurality of SDMA data streams have been converted from a first time domain to the frequency domain, wherein the separation module is configured to separate the plurality of SDMA data streams in the frequency domain based at least in part on a channel matrix, and wherein the plurality of SDMA data streams have been received as a plurality of uplinked SDMA data streams that are out of synchronism by a time period greater than an allowed guard band time period; a synchronization module to synchronize the separated plurality of data streams in a second time domain after the separated plurality of data streams have been converted from the frequency domain to the second time domain; and a wireless access point coupled to a plurality of antennas to receive the plurality of SDMA data streams.

Support for claim 44 may be found at least in the following identified portions of the specification as filed. Fig. 2 illustrates a separation module (demultiplexer 234) to separate a plurality of SDMA data streams into a plurality of separated data streams (paragraph 0025), in a frequency domain, after the plurality of SDMA data streams have been converted from a first time domain to the frequency domain (e.g., by FFT modules 238, see Fig. 2, paragraph 0026, lines 1-5; and paragraph 0027, lines 1-3). The plurality of SDMA data streams may be received as a plurality of uplinked SDMA data streams that are out of synchronism by a time period greater than an allowed guard band time period (paragraph 0010, lines 6-10; paragraph 0011, lines 3-5; and paragraph 0021). Fig. 2 also illustrates a synchronization module to synchronize the separated plurality of data streams in a second time domain (block 351 of Fig. 3, paragraph 0039, lines 4-5) after the separated plurality of data streams have been converted from the frequency domain to the second time domain (paragraph 0035).

Fig. 2 also illustrates a wireless access point 268 coupled to a plurality of antennas 264 to receive the plurality of SDMA data streams (paragraph 0030, lines 1-2).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 27-28, 31, 33-39 and 47 are unpatentable under 35 U.S.C. § 103(a) over Ogawa in view of Shattil and Priotti.

Whether claims 29 and 30 are unpatentable under 35 U.S.C. § 103(a) Ogawa, in view of Shattil, Priotti, and Perahia.

Whether claims 40 and 42-46 are unpatentable under 35 U.S.C. § 103(a) over Perahia, in view of Shattil and Priotti.

Whether claim 41 is unpatentable under 35 U.S.C. § 103(a) over Perahia, in view of Shattil, Priotti and Shattil'070.

VII. ARGUMENTS

As is well established, the Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. *Manual of Patent Examining Procedures (MPEP)*, § 2142, Eighth Edition, Revision 8 (July 2010). A factual basis sufficient to support a prima facie conclusion of obviousness will be one, which when viewed by a person of ordinary skill in the art, makes the invention, as a whole, obvious. Id. The Supreme Court in Graham v. John Deere Co. set out the inquiries necessary to develop this factual basis. 383 U.S. 1, 17-18 (1966); see also MPEP 2141. These inquiries include determining the scope and content of the prior art; ascertaining the differences between the prior art and the claims at issue; and resolving the level of ordinary skill in the art. The analysis supporting a finding of obviousness should be made explicit. See KSR International Co. v. Teleflex Inc., 550 U.S. 398, 418 (2007); see also MPEP 2141.

The Examiner has failed to factually support a prima facie conclusion of obviousness with respect to claims 27-31 and 33-47.

REJECTIONS UNDER 35 U.S.C. § 103 - CLAIMS 27-28, 31, 33-39 and 47

Claims 27-28, 31, 33-39 and 47 were rejected over Ogawa in view of Shattil and Priotti.

Independent claim 27 recites in part:

> receiving from multiple stations ... a plurality of ... SDMA data streams ...;
>
> converting the plurality of SDMA data streams from a first time domain to a frequency domain;
>
> separating ... the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain ...;
>
> converting the separated plurality of data streams from the frequency domain to a second time domain; and
>
> synchronizing the separated plurality of data streams in the second time domain.

Thus, in claim 27, synchronization of the separated plurality of data streams is performed in the second time domain, i.e., performed after various other recited features of claim 27 have been performed.

The Office Action alleges that Ogawa discloses receiving a plurality of SDMA data streams, but acknowledges that Ogawa fails to disclose various other features of claim 27. The Office Action further alleges that Shattil discloses converting the plurality of SDMA data streams from a first time domain to a frequency domain, separating the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain, and converting the separated plurality of data streams from the frequency domain to a second time domain, as recited in claim 27. The Office Action then acknowledges that Ogawa and Shattil fail to disclose synchronizing the separated plurality of data streams in the second time domain, but alleges that Priotti discloses such features.

Priotti fails to disclose "synchronizing the separated plurality of data streams in the second time domain," as recited in claim 27

Priotti discloses, in Fig. 1, a transmitter 102 and a receiver 106. The receiver 106 includes a time synchronization module 116 for synchronizing signals received by the receiver 106. The Office Action alleges that Priotti's first time domain occurs in the

transmitter 102 and also alleges that Priotti's time synchronization module 116 performs synchronization in a second time domain. In claim 27, prior to synchronization in a second time domain, a plurality of SDMA data streams are *received and converted from a first time domain to a frequency domain.* As prior to time synchronization in the time synchronization module 116, there is no reception of SDMA data streams (the transmitter 102 in Priotti does not *<u>receive</u>* SDMA data streams) and conversion from a first time domain to a first frequency domain, Priotti's time synchronization module 116 cannot be said to perform synchronization in a *<u>second</u> time domain,* as recited in claim 27.

In a different interpretation of Priotti, the Office Action also contends that Priotti's time synchronization module 116 discloses the recited first time domain, and synchronization in the second time domain occurs in a demodulation module 130 in Priotti's receiver 106. Appellant respectfully disagrees with this interpretation of Priorri for the following reasons.

In Priotti's receiver 106, time synchronization is performed in the time synchronization module 116. "An FFT module 118 is connected to the [time] synchronization module 116 for converting the OFDM signal from the time domain to the frequency domain."[1] Thus, Priotti discloses converting signals from a time domain to a frequency domain. The signals are further processed, in the frequency domain, by a frequency offset and correction module 126, as illustrated in Fig. 1.[2] Priotti further discloses that a "demodulation module 130 is connected to the frequency offset and estimation correction module 126 for demodulating the OFDM signal and, optionally, for fine time synchronization (further to the synchronization performed by the module 116)."[3] Thus, the demodulation module 130 performs fine time synchronization. Priotti, however, does not disclose or even suggest that the demodulation module 130 operates in a time domain, or that signals are converted from a frequency domain to a time domain, before being processed by the demodulation module 130. Referring to

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[1] Priotti, paragraph 0043, lines 4-7.
[2] Also see Priotti, paragraph 0051.
[3] Priotti, paragraph 0052, lines 1-5.

Priotti's Fig. 1, the FFT module 118 converts signals from a time domain to a frequency domain. Nowhere does Priotti disclose or even suggest converting the signals into another time domain from the frequency domain, before the demodulation module 130 processes the signals. Accordingly, there is no disclosure or suggestion in Priotti that the fine time synchronization in the demodulation module 130 is performed in time domain. Hence, Priotti cannot be said to disclose *synchronizing the separated plurality of data streams in the second time domain*, as recited in claim 27.

Furthermore, Priotti discloses receiving signals from a single transmitter 102. In contrast, in claim 27, the plurality of SDMA data streams are received from multiple stations. Thus, Priotti fails to disclose synchronizing SDMA data streams that <u>are received from multiple stations</u>.

<u>Priotti is not properly combined with Shattil</u>

Even if, *arguendo,* Priotti discloses synchronizing the separated plurality of data streams in a second time domain (although, as discussed above, Priotti does not disclose such features), Appellant respectfully submits that for the following reasons, Priotti is not properly combined with Shattil.

In claim 27, the recited synchronization in the second time domain is performed to correct or compensate out-of-synchronism SDMA data streams. In Shattil, compensation or correction for various channel associated factors, like channel distortions (such as multipath fading) are already carried out in frequency domain.[4] Accordingly, Shattil does not need any additional compensation or synchronization in a time domain. The Office Action has not identified any reason in Shattil, Priotti, or elsewhere, to modify Shattil to provide an additional conversion to another time domain and synchronization in that time domain, as Shattil has already performed the compensation in the frequency domain. That is, synchronization in the time domain, as recited in claim 27, is a redundant step in Shattil. For at least these reasons, there is no articulable reason to modify Shattil in light of Priotti as is asserted in the Office Action.

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[4] Shattil, paragraph 0134, 0135, and 137.

Shattil fails to disclose various features of claim 27

Claim 1 recites in part:

> computing ... a *channel matrix* that is representative of a channel response for each of a plurality of channels ...;
> receiving ... a plurality of ... SDMA data streams ...;
> converting the plurality of SDMA data streams from a first time domain to a frequency domain;
> *separating*, with a spatial demapper, *the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain based at least in part on the* *channel matrix*...

The Office Action acknowledges that Ogawa fails to disclose features associated with separating the plurality of data streams based on the channel matrix,[5] but alleges that Shattil cures such deficiencies of Ogawa. In the "Response to Arguments" section of the Office Action, the Office Action alleges that claim 27 lacks any details of the recited channel matrix. Appellant respectfully disagrees. Claim 27 recites that the channel matrix is representative of a *channel response* for each of a plurality of channels. Appellant agrees, as alleged by the Office Action, that both Shattil and Ogawa discloses channel matrices. However, for the following reasons, Appellant respectfully submits that Shattil and Ogawa fail to disclose *separating the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain based at least in part on the channel matrix*.

The Office Action equates Shattil's element 225 in Fig. 2B with the recited spatial demapper used for separating the data streams. The Office Action also refers to Shattil's Figs. 4J and 10B to allege that Shattil discloses separating data streams. Furthermore, the Office Action alleges that Shattil teaches a channel matrix as a product matrix, as illustrated in Fig. 5b.

In Fig. 5b, a plurality of weights w1 to wN are generated from a set of data symbols d1 to dN mapped to a number N of orthogonal CI phase spaces. A CI code matrix of dimension NxN containing polyphase code chips is multiplied by a set of data vectors or a data matrix to generate various weights w1, ..., wN. For the matrix of Shattil's Fig. 5b to be equated to the recited channel matrix, the matrix has to be

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[5] Office Action, page 6, fourth paragraph.

representative of a channel response for each of a plurality of channels, as recited in claim 27. As discussed, the matrix of Shattil's Fig. 5b is based on data symbols d1, ..., dN, and various CI codes. However, as is well known to those skilled in the art, data symbols d1, ..., dN are not representative of a channel response. Rather, data symbols d1, ..., dN are actual data that are transmitted over the channel. Also, nowhere does Shattil disclose that the CI codes are representative of the channel response. Accordingly, Appellant respectfully submits that the weights w1, ..., wN are not representative of the channel response, as recited in claim 27.

Even if, *arguendo*, the weights w1, ..., wN are somehow assumed to be representative of the channel response and therefore equated to the recited channel matrix, Appellant respectfully submits that for the following reasons, Shattil does not disclose that the separating in the frequency domain is based on the channel matrix.

The Office Action cites paragraphs 0191-0192 of Shattil to allege that Shattil discloses separating data streams based on a channel response. Cited paragraphs 0191-0192 of Shattil disclose the following:

> "Each of the invertible-transform circuits 1104.1 to 1104.M transforms an input time-domain signal into a plurality N of frequency-domain components. The components are weighted with at least one set of CI combining weights am(n) ... by a plurality M of component-weighting modules 1105.1 to 1105.M. In the case where MMSE combining is employed, the weights $\alpha_m(n)$ are expressed by:
>
> $$\alpha_m(n)=h_m{}^*(n)/(N|_m(n)|^2+\sigma^2)$$
>
> where $h_m(n)$ is the channel response for the n^{th} frequency channel of the m^{th} spatial subchannel..." (Underlining added).

Thus, in the cited section, Shattil discloses transforming an input time domain signal into N frequency domain components, and subsequently weighing the components using weights (note that these weights are different from the previously discussed weights w1, ..., wN) that are associated with channel responses. Although Shattil discloses weighing the N frequency domain components using weights that are associated with channel responses, Shattil does not disclose or suggest ***any separation of signals being done in the frequency domain, based on the channel response***. Rather, after the input signal is already separated (while transforming from

time domain to frequency domain), Shattil weighs the N frequency domain components using weights that are associated with channel responses. Thus, Shattil does not disclose or suggest _separating_ ... *the plurality of SDMA data streams* ... _based at least in part on the channel matrix_, as recited in claim 1. Rather, Shattil merely discloses weighing signals based on channel responses.

For at least these reasons, claim 27 is allowable, along with associated dependent claims 28, 31, 33-34 and 47.

Independent claim 35 includes features that are similar to those discussed with respect to claim 1. Accordingly, claim 35 is allowable for at least the reasons claim 27 is allowable, along with associated dependent claims 36-39.

REJECTIONS UNDER 35 U.S.C. § 103 - CLAIMS 29 and 30

Claims 29 and 30 were rejected under 35 USC 103(a) as being unpatentable over Ogawa in view of Shattil and Priotti, as applied to claim 27, and further in view of Perahia. Although Perahia arguably discloses receiving data streams in response to a polling communication, Perahia does not cure the above-discussed deficiencies of Ogawa, Shattil and Priotti. Accordingly, claims 29 and 30 are allowable for at least the reasons associated independent claim 1 is allowable.

REJECTIONS UNDER 35 U.S.C. § 103 - CLAIMS 40 and 42-46

Claims 40 and 42-46 were rejected under 35 USC 103(a) as being unpatentable over Perahia in view of Shattil and Priotti. Independent claims 40 and 44 recite features similar to the above discussed features of independent claim 27. Although Perahia arguably discloses features associated with SDMA data streams, Perahia does not cure the above discussed deficiencies of Shattil and Priotti. Accordingly, independent claims 40 and 44 are allowable for at least the reasons associated independent claim 27 is allowable, along with associated dependent claims 42-43 and 45-46.

REJECTIONS UNDER 35 U.S.C. § 103 - CLAIMS 41

Claim 41 was rejected under 35 USC 103(a) as being unpatentable over Perahia in view of Shattil and Priotti, as applied to claims 27 and 40, and further in view of Shattil'070. Although Shattil'070 arguably discloses features associated with a demultiplexer, Shattil'070 does not cure the above discussed deficiencies of Shattil and Priotti. Accordingly, claim 41 is allowable for at least the reasons associated independent claim 40 is allowable.

CONCLUSION

For at least these reasons, Appellant respectfully submits that all the appealed claims in this application are patentable and requests that the BPAI overrule the Examiner and direct allowance of the rejected claims.

This brief is submitted in triplicate, along with a check for $500 to cover the appeal fee for one other than a small entity as specified in 37 C.F.R. § 1.17(c). Additionally, we submit herewith a petition and fees for an extension of time for response within a first extension period according to 37 C.F.R. § 1.136(a). We do not believe any other fees are needed. However, should that be necessary, please charge our Deposit Account No. 500393. In addition, please credit any overages to the same account.

SCHWABE, WILLIAMSON & WYATT, P.C.

Dated: January 24, 2011

/Nathan R. Maki/

Nathan R. Maki, Reg. No. 51110

Pacwest Center, Suite 1900.
1211 SW Fifth Avenue
Portland, OR 97204
Telephone: 503-222-9981.

VIII. CLAIMS APPENDIX

1. - 26. (Canceled)

27. A method comprising:

computing, by a wireless access point, a channel matrix that is representative of a channel response for each of a plurality of channels, said computing based at least in part on on training signals received over two or more antennas from multiple stations;

receiving from multiple stations, at the wireless access point, a plurality of uplinked spatial division multiple access (SDMA) data streams that are out of synchronism by a time period greater than an allowed guard band time period;

converting the plurality of SDMA data streams from a first time domain to a frequency domain;

separating, with a spatial demapper, the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain based at least in part on the channel matrix;

converting the separated plurality of data streams from the frequency domain to a second time domain; and

synchronizing the separated plurality of data streams in the second time domain.

28. The method of claim 27, wherein the receiving comprises:

receiving at least some of the plurality of SDMA data streams as data streams that include a plurality of non-aligned orthogonal frequency division multiplexed symbols.

29. The method of claim 27, wherein the receiving comprises:

receiving the plurality of SDMA data streams in response to a polling communication.

30. The method of claim 29, wherein the polling communication comprises multiple polling messages overlapping in time and corresponding in number to the multiple stations.

31. The method of claim 27, wherein the separating comprises:

separating the plurality of SDMA data streams using a channel matrix.

32. (Cancelled)

33. The method of claim 27, wherein the separating comprises:

separating the plurality of SDMA data streams into a separated plurality of data streams, wherein at least some of the separated plurality of data streams have different frequency offsets.

34. The method of claim 27, wherein a number of the separated plurality of data streams correspond to a like number of wireless channels.

35. An article comprising a memory have instructions stored thereon, wherein the instructions, when executed, cause the processor to perform:

computing, by a wireless access point, a channel response for each of a plurality of channels based on training signals received over two or more antennas from multiple stations, the computed channel response includes at least a channel matrix;

converting a plurality of spatial division multiple access (SDMA) data streams from a first time domain to a frequency domain after the plurality of SDMA data streams have been received as a plurality of uplinked SDMA data streams that are out of synchronism by a time period greater than an allowed guard band time period;

separating the plurality of SDMA data streams in the frequency domain into a separated plurality of data streams in the frequency domain based on the channel matrix;

converting the separated plurality of data streams from the frequency domain to a second time domain; and

synchronizing the separated plurality of data streams in the second time domain.

36. The article of claim 35, wherein the separating comprises:

separating the plurality of SDMA data streams at a wireless access point.

37. The article of claim 35, wherein the plurality of channels correspond in number to a number of the plurality of SDMA data streams.

38. The article of claim 35, wherein the synchronizing comprises:

synchronizing at least one of the separated plurality of data streams after detecting a boundary between preambles.

39. The article of claim 35, wherein the instructions, when executed, cause the processor to perform:

estimating a coarse frequency offset between receiver and transmitter oscillator clocks.

40. An apparatus, including:

a separation module to separate a plurality of spatial division multiple access (SDMA) data streams into a plurality of separated data streams, in a frequency domain, after the plurality of SDMA data streams have been converted from a first time domain to the frequency domain, wherein the separation module is configured to separate the plurality of SDMA data streams in the frequency domain based at least in part on a channel matrix, and wherein the plurality of SDMA data streams have been received as a plurality of uplinked SDMA data streams that are out of synchronism by a time period greater than an allowed guard band time period; and

a synchronization module to synchronize the separated plurality of data streams in a second time domain after the separated plurality of data streams have been converted from the frequency domain to the second time domain.

41. The apparatus of claim 40, wherein the separation module comprises:
a spatial demultiplexer to provide the separated plurality of data streams.

42. The apparatus of claim 40, wherein the separation module comprises:
a module to perform a fast Fourier transform on the plurality of SDMA data streams.

43. The apparatus of claim 40, wherein the separation module comprises:
a module to perform an inverse fast Fourier transform on at least one of the separated plurality of data streams.

44. A system, comprising:
a separation module to separate a plurality of spatial division multiple access (SDMA) data streams into a plurality of separated data streams, in a frequency domain, after the plurality of SDMA data streams have been converted from a first time domain to the frequency domain, wherein the separation module is configured to separate the plurality of SDMA data streams in the frequency domain based at least in part on a channel matrix, and wherein the plurality of SDMA data streams have been received as a plurality of uplinked SDMA data streams that are out of synchronism by a time period greater than an allowed guard band time period;
a synchronization module to synchronize the separated plurality of data streams in a second time domain after the separated plurality of data streams have been converted from the frequency domain to the second time domain; and
a wireless access point coupled to a plurality of antennas to receive the plurality of SDMA data streams.

45. The system of claim 44, wherein the channel matrix is a Q x P matrix, the system further comprising;

a processor to form the Q x P channel matrix, wherein the plurality of antennas comprises Q antennas, and wherein the plurality of SDMA data streams comprises P data streams.

46. The system of claim 44, wherein the wireless access point is to train at least one channel for at least some of a plurality of stations associated with the plurality of SDMA data streams.

47. The method of claim 27, wherein at least two of the plurality of uplinked SDMA data streams are out of synchronism greater than 0.8 microseconds.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.